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Frequency of spondyloarthropathy in patients with end-stage chronic renal failure and receiving hemodialysis therapy

Hemodiyaliz tedavisi almakta olan son dönem böbrek yetmezliği hastalarında spondiloartropati sıklığı

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ÖZET

AMAÇ: Spondiloartropati (SpA), renal replasman tedavisi (RRT) alan son dönem böbrek yetmezliği (SDBY) olan hastalarda beta2-mikroglobulin (beta2-M) birikimi nedeniyle özellikle aksiyal eklemlerin enflamatuar yıkımına bağlı olarak gelişir. Bu çalışmada, RRT alan SDBY hastalarında SpA sıklığını ve bunun enflamatuar sırt ağrısı (ESA) ile enflamatuar klasik SpA tanı kriter setleri ile olan ilişkisi araştırılmıştır.

GEREÇ VE YÖNTEM: Toplam 140 hemodiyaliz tedavisi ile takip edilmekte olan hasta dahil edildi. Hastalardan demografik bilgiler, laboratuvar testleri, klinik bulgular, HLA (insan lökosit antijen) allel alt gruplarının verileri toplandı. SpA'ya bağlı ağrısı olan hastalarda sakroiliak ve ayak lateral grafileri ve tanı netleştirilemeyen hastalardan gerekirse sakroiliak tomografi çekildi. SpA sıklığı, Amor ve ESSG (The European Spondyloarthropathy Study Group) tanı kriter setlerine göre araştırıldı.

BULGULAR: Elli iki hasta (%37) kadındı. Ortanca yaş 51 ± 15 idi. Hastaların 22'sinde (%16) ESA ve 28'inde (%20) sakroiliit saptandı. CRP açısından ESA'ya ve sakroiliite göre anlamlı fark vardı (p=0.028, p=0.043). 21 (%15) hastada SpA tespit edildi. HLA-A1 varlığı ve HD süresi SpA için bağımsız risk faktörleri olarak belirlendi.

SONUÇ: SDBY olan ve HD tedavisine girmekte olan hastalarda SpA tanısında radyolojik kriterlere ek olarak ağrının enflematuvar karakterde olup olmadığı ve enflamatuar belirteçler araştırılmalıdır.

Anahtar kelimeler: Destürkitif spondiloartropati, hemodiyaliz, beta2-mikroglobulin, böbrek yetersizliği

ABSTRACT

AIM: Destructive spondyloarthropathy (dSpA) occurs due to inflammatory destruction of axial joints due to beta2-microglobulin (beta2-M) accumulation in patients with end-stage renal disease (ESRD) receiving renal replacement therapy (RRT). The aim of the study was to investigate the frequency of dSpA in ESRD patients receiving RRT, by the diagnostic criteria sets of inflammatory back pain (IBP) and inflammatory classical SpA.

MATERIAL AND METHOD: A total of 140 patients were included. The data of the demographic informations, laboratory tests, clinical findings, HLA allele subgroups were collected. Sacroiliac and lateral feet X-rays and if necessary sacroiliac tomography were taken in patients with dSpA related pain. dSpA was investigated according to the Amor and ESSG criteria sets.

RESULTS: Fifty two patients were women (37%). The mean age was 51 ± 15 years. IBP and sacroiliitis were detected in 22 (16%) and 28 (20%) of the patients, respectively. There was a significant difference according to sacroiliitis and IBP in terms of CRP (p=0.028, p=0.043). dSpA were detected in 21 (15%) patients. Presence of HLA-A1 and duration of HD were determined as independent risk factors for dSpA.

CONCLUSION: In the diagnosis of dSpA, the character and inflammatory origin of the pain and inflammatory markers should be investigated in addition to the radiological criteria.

Keywords: Destructive spondyloarthropathy, hemodialysis, beta2-microglobulin, kidney failure

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INTRODUCTION

End-stage renal disease (ESRD) is a major global health problem, and the number of patients receiving renal replacement (RRT) therapies treatment is constantly increasing.1 With the application of RRT, the life expectancy of ESRD patients has been prolonged. One of the problems observed with the prolongation of life in patients receiving RRT is the destructive spondyloarthropathy (SpA). Destructive SpA can be observed in patients undergoing both hemodialysis (HD) and peritoneal dialysis, but because of the greater number of patients receiving HD treatment, destructive SpA has been associated with HD patients as more. On the other hand, classical SpA is a group of inflammatory arthritis classified as ankylosing spondylitis, reactive arthritis, spondyloarthritis associated with psoriasis, spondyloarthritis associated with inflammatory bowel disease.[2] In this classical SpA definition, inflammatory back pain (IBP) is the leading component of SpA. IBP definition criteria are known as morning stiffness greater than 30 minutes, improvement in back pain with exercise but not with rest, nocturnal awakening, and alternating buttock pain according to Berlin criteria.[2] Classical SpA diagnosis can be made by applying some criteria including European Spondyloarthropathy Study Group (ESSG) or Amor.[2] Apart from this typical classification, it is known that SpA-like clinical findings may develop in patients with ESRD.[3] These clinical findings are thought to be mostly related to articular destruction due to B2 microglobulin accumulation.[4_5] The clinical findings of destructive SpA differ from the classical SpA group defined above. The diagnosis of destructive SpA is made according to the radiological findings, there are no definitive diagnostic criteria in terms of the character of the pain and other clinical findings.5 Destructive SpA often causes pathology in the cervical vertebrae and patients often complain of neck pain.[6_7] Destructive SpA may be accompanied by neurological findings related to nerve compression, such as loss of muscle strength, numbness in the related extremity area.[6_7_8_9] At the same time, the pain characteristics are of sudden onset, continuous, not relieve by rest, and does not decrease with movement. Therefore, the pain character of destructive SpA does not match with the IBP.[2] However, articular pain related to SpA in ESRD patients RRT can still be expected to be of inflammatory type. The accumulation of beta2-microglobulin in the musculoskeletal system triggers chronic inflammation in destructive SpA patients.[3_10] Also, patients with destructive SpA are usually identified and presented in the presence of such an advanced level of destruction as to require surgical intervention.[6_7_8_9] To our best knowledge, clinical conditions matching the definition of classical spondyloarthropathy associated with IBP criteria in patients with ESRD have not been investigated before. The question of whether there are IBP, sacroiliitis, or spondyloarthropathy conditions by the classical definition in patients with ESRD and undergoing hemodialysis deserves to be investigated. In the light of this information, this cross-sectional clinical study was planned to investigate the findings matching with the classical IBP classification and SpA definition in ESRD patients receiving RRT.

MATERIAL AND METHOD

Patients

A total of 140 patients who were in the hemodialysis program at Baskent University Ankara Hospital Hemodialysis Unit were included in the study. Patients who were diagnosed with spondyloarthropathy, ankylosing spondylitis, septic arthritis, serious infectious diseases (such as peritonitis, catheter infection, pneumonia, sepsis) or whose joint pain started earlier than the date of diagnosis of chronic renal failure (CRF) were not included in the study. This cross-sectional study was approval was obtained from the local ethics committee of Baskent University Faculty of Medicine in accordance with the decision numbered 11/92. Written informed consent was obtained from all patients included in the study. First of all, the data of the demographic information, the etiology of chronic kidney failure, total time of hemodialysis treatment, joint pain conditions, the duration of the pain, the character of pain (inflammatory or not), presence of tenderness in the entheseal sites during physical examination, and the response of the joint pain to the usage of NSAIDs were collected. The condition of the joint pain is inflammatory or not was determined according to the Berlin criteria for IBP.2 Sacroiliac direct X-rays and both feet lateral X-rays were taken in all patients who have back pain, cervical spine pain, heel pain, Achilles tendon pain, or asymmetrical lower extremity pain. Obtained direct radiography images were evaluated separately by two rheumatologists. The radiological grading of sacroiliitis was made according to the recommendations of the New York Conference for Population Studies.[11] Achilles tendon enthesopathy and epin calcanei were graded as minimal or prominent spurs.[12] If the sacroiliitis status could not be determined clearly when the direct radiographs were evaluated, the bilateral sacroiliac comparative tomography examination was performed. Then, the presence of spondyloarthropathy in the patients was investigated according to the Amor and ESSG criteria sets.[2]

Statistical Analysis

Statistical analysis was performed using the IBM SPSS statistics program version 22. Whether the continuous variables showed normal distribution or not was determined by evaluating the histogram, Kolmogorov - Smirnov test, Skewness, and Kurtosis parameters. Continuous variables with normal distribution are shown as mean ± standard deviation. Continuous variables without normal distribution are shown as median and interquartile ranges. Categorical variables were presented as frequencies and percentages. Patients were divided into two groups as SpA group and the non-SpA group, also divided into the IBP group and the non-IBP group. The Mann-Whitney U test was used to compare the continuous variables between the two independent groups. The Chi-square test was used to compare categorical variables. Among the variables which had statistically significant differences regarding SpA diagnosis, the logistic regression analysis was performed to determine the variables that were independently related to SpA diagnosis. After the determination of independent risk factors for SpA diagnosis, ROC (Receiver Operating Characteristic) curve analyzes were performed. The compatibility of AMOR and ESSG criteria sets in the diagnosis of SpA was determined using Kappa statistics. Intraclass correlation coefficiency was used to determine the agreement between the two rheumatologists in the evaluation of the direct radiographs in terms of sacroiliitis, epin calcanei, Achilles tendon enthesopathy.

RESULTS

A total of 140 patients were included in the study, and 52 of them were women (37.1%). The mean age of the patients was 51±15 years. Demographic and clinical information of the patients is presented in table 1.

Table 1. Demographic and some clinical data of patients

Clinical variables	All patients n = 140	SpA Group n = 21 (15%)	NonSpA Group n =119
Age (years)*	51 ± 15	52 ± 8	51 ± 16
Gender (female), n (%)	52 (37.1)	8 (38.5)	44 (37)
CRF diagnosis time (years)*	**10.5 [3.5-16]**	**14 [10 – 17.5]**	**9.5 [3-15]**
Primary etiology of CRF			
• Essential hypertension	32 (22.9)	5 (23.8)	27 (22.7)
• Unknown etiology	26 (18.6)	4 (19)	22 (18.5)
• Glomerulonephritis	14 (10)	2 (9.5)	12 (10.1)
• Vesicoureteral reflux disease	11 (7.9)	2 (9.5)	9 (7.6)
• Diabetes mellitus	10 (7.1)	1 (4.8)	9 (7.6)
• Polycystic renal disease	9 (6.4)	3 (14.3)	6 (5)
• Nephrolithiasis	**7 (5)**	**3 (14.3)**	**4 (3.4)**
• Pyelonephritis	7 (5)	-	7 (5.9)
• Familial mediterranean fever	4 (2.9)	1 (4.8)	3 (3.5)
• Preeclampsia	2 (1.4)	-	2 (1.7)
• Hydroureteronephrosis	2 (1.4)	-	2 (1.7)
• Renal agenesis	1 (0.7)	1 (4.8)	-
• Systemic lupus erythematosus	1 (0.7)	1 (4.8)	-
• Rheumatoid arthritis	1 (0.7)	-	1 (0.8)
• Alport syndrome	1 (0.7)	-	1 (0.8)
• Wegener's vasculitis	1 (0.7)	-	1 (0.8)
• Cystinosis	1 (0.7)	-	1 (0.8)
HD time (years)*	**8 [2.5-13]**	**13 [6.5 - 15.5]**	**7 [2-12]**
Renal Tx and rejection, n (%)	30 (21.4)		26 (21.8)
Serum CRP (mg/dL)**	7.6 [3.6-16.6]	7.4 [2.7 - 19.5]	7.6 (3.7-16.4)
Sedimentation (mm/hr)**	51 [25-70]	46 [21 - 69]	50 [25-70]
Serum Parathormone (pg/mL)**	**352 [176-588]**	**521 [281 - 1135]**	**341 [161-553]**

n = Number

* mean value ± standard deviation

** median value [interquartile range]

CRF: Chronic renal failure; HD: Hemodialysis; Tx: Transplantation; CRP: Serum C-reactive protei milligram/deciliter; mm/hr: millimeters/hour; pg/mL: picogram/ milliliter;

The number of patients suffering from articular pain was 51 (36.4%). The mean age of the onset of joint pain in these patients was 46.5±14.3 years. Presence of the tendernesses in the lumbar spinous processes, thoracic spinous processes, hip joint, Achilles tendon, heel, and cervical spinous processes was determined as respectively 32 (22.9%), 9 (6.4%), 7 (5%), 4 (2.9%), 4 (2.9%), 1 (0.7%) of the patients. Inflammatory back pain without synovitis was detected in 19 (13.5%) of the patients. Synovitis-related pain without inflammatory back pain was detected in 1 (0.7%) of the patients. Inflammatory back pain and synovitis-related pain were together detected in 3 (2.1) patients. Asymmetric oligoarthritis-related pain in the lower extremity was detected in 4 (2.9%) patients. The distribution of inflammatory pain in each joint area according to Berlin criteria is given in table 2.

Table 2. The distribution of inflammatory back pain in each joint area according to Berlin criteria

	Inflammatory back pain, N=22 (15.7%		
Berlin criteria for inflammatory back pain	Lumbosacral region of the back n=17 (12.1%)	Thoracic vertebral region of the back n=6 (4.2%)	Cervic vertebr of the b n=1 (0.
Morning stiffness of > 30 min duration	17	5	1
Improvement in back pain with exercise but not with rest	17	6	1
Nocturnal awakening (second half of the night only)	14	5	1
Alternating buttock pain	17	6	1

n: The number of the patients

Bilateral sacroiliac X-rays and lateral foot X-rays were performed in 43 of these 51 patients with joint pain. Bilateral sacroiliac X-rays and lateral foot X-rays could not be obtained for the remaining 8 patients who did not want to go x-rayed examination. Computed tomography of sacroiliac joints was performed in 5 patients whose presence of sacroiliitis was not evaluated by direct radiography. Sacroiliitis was detected in a total of 28 (20%) patients according to these sacroiliac X-rays and tomography. Among these patients, sacroiliitis was detected in 9 (6.4%) patients as grade 1, in 12 (8.6%) patients as grade ², and in 7 (5%) patients as grade 3 (5%). When patients with grade 1 sacroiliitis and patients without sacroiliitis were compared, no statistical difference was found in terms of serum CRP levels (p=0.143). But, when patients with ≥ grade 2 sacroiliitis and patients without sacroiliitis were compared, a statistically significant difference was found in terms of serum CRP levels (p=0.028). Achilles tendon enthesopathy was detected in a total of 16 (11.4%) patients according to these lateral foot X-rays. Among these patients, Achilles tendon enthesopathy was detected in 6 (4.2%) patients as a minimal spur, in 10 (7.1%) patients as prominent spur. Epin calcanei were detected in a total of 19 (13.5%) patients according to these lateral foot X-rays. Among these patients, epin calcanei were detected in 14 (10%) patients as minimal spur, in 5 (3.6%) patients as prominent spur. According to the reliability test between the two rheumatologists, a high degree of correlation was found (intraclass correlation (ICC)=0.758, p=0.0001 for the sacroiliitis decision, ICC=0.713, p=0.0001 for the epin calcanei decision, ICC=0.646, p=0.001 for the Achilles tendon enthesopathy decision). The radiological and clinical differences between patient groups with and without inflammatory back pain are presented in table 3.

Table 3. The radiological and clinical differences between patient groups with and without inflammatory back pain

Parameters	All articular pain, n=51	Patients with IBP, n=22	Patients without IBP, n=29	P value
erum CRP (mg/dL)**	**7 [3-17]**	**13 [4-22]**	**4.8 [2.5-8.1]**	**0.043***
edimentation (mm/hr)**	48 [20-69]	36 [21-61]	56 [20-74]	0.538
erum PTH (pg/mL)**	383 [142-678]	369 [233-623]	408 [125-735]	0.608
acroiliitis, n (%)	**28 (54.9)**	**18 (81.8)**	**10 (34.5)**	**0.0001**
Grade 1, n (%)	9 (17.6)	4 (18.2)	5 (17.2)	0.986
Grade ≥ 2, n (%)	**19 (37.3)**	**14 (63.6)**	**5 (17.2)**	**0.001***
pin calcanei, n (%)	19 (37.3)	8 (36.4)	11 (37.9)	0.614
Minimal spur, n (%)	14 (27.5)	6 (27.3)	8 (27.6)	0.904
Prominent spur, n (%)	5 (9.8)	2 (9.1)	3 (10.3)	0.843
.chilles TE, n (%)	16 (31.4)	5 (22.7)	11 (37.9)	0.383
Minimal spur, n (%)	6 (11.8)	1 (4.5)	5 (17.2)	0.148
Prominent spur, n (%)	10 (19.6)	4 (18.2)	6 (20.7)	0.764

= Number

E: Tendon enthesopathy; IBP: Inflammatory back pain;

: There is a statistically significant difference

According to the Amor criteria set, spondyloarthropathy was detected in 21 (15%) patients. According to the ESSG criteria set, spondyloarthropathy was detected in 20 (14.3%) patients. A strong agreement was found between the Amor and ESSG criteria sets (Kappa = 0.8, p=0.0001). The clinical and laboratory differences according to SpA diagnosis provided by Amor criteria sets were presented in Table 1. Similarly, statistically significant differences were found in the parameters of diagnosis time of CRF, duration of HD, and presence of nephrolithiasis etiology compared to SpA diagnosis proven by ESSG criteria sets (p=0.038, p=0.043, p=0.027, respectively). The differences between HLA (human leukocyte antigen) alleles according to the SpA diagnosis of the patients were presented in Table 4.

Table 4. HLA subgroups which have statistically significant differences according to SpA diagnosis

HLA subgroups	All patients n=140	SpA Group n=21	Non SpA Group n=119	P values
HLA - BW6, n (%)	39 (27.8)	10 (47.6)	29 (24.4)	**0.029***
HLA - A01, n (%)	13 (9.2)	5 (23.8)	8 (6.7)	**0.013***
HLA - A32, n (%)	4 (2.8)	3 (14.3)	1 (0.8)	**0.001***
HLA - DQ4, n (%)	4 (2.8)	2 (9.5)	2 (1.7)	**0.047***
HLA - B37, n (%)	3 (2.1)	2 (9.5)	1 (0.8)	**0.012***
HLA – B27, n (%)	3 (2,1)	-	3 (2.5)	0.464

n: number;

*: There is a statistically significant difference

HLA: Human leukocyte antigen; SpA: Spondyloarthropathy

According to logistic regression analysis, having HLA-A1 subgroup allele and duration of hemodialysis treatment were determined as independent risk factors for SpA (Table5).

Table 5. The independent risk factors for SpA according to logistic regression analysis between clinical factors which have statistically significant difference

Parameters	P value	Wald	Exp (B)	95% CI
Nephrolithiasis	0.310	1.032	2.458	0.433 - 13.939
Parathormone	0.131	2.283	1.001	1.000 - 1.002
Total hemodialysis time	**0.043**	**4.108**	**1.079**	**1.003 - 1.162**
HLA – A01	**0.041**	**4.177**	**4.104**	**1.060 - 15.896**
Age	0.308	1.037	1.021	0.981 - 1.062

HLA: Human leukocyte antigen; SpA: Spondyloarthropathy

According to the ROC analysis, SpA can develop with a sensitivity of 62% and a specificity of 68% in patients who have been on HD treatment for more than 10.5 years

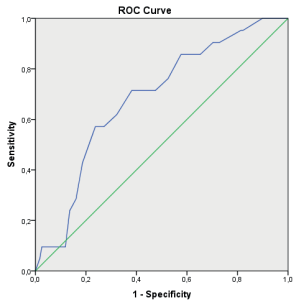

Figure 1: ROC curve analysis for SpA development in terms of total hemodialysis duration
AUC: 0.684, p=0.007, likelihood ratio=2, sensitivity=62%, specificity=68%

DISCUSSION

The number of patients diagnosed with ESRD is increasing worldwide, and the proportions of patients with stage 4 - stage 5 according to the KDIGO (Kidney Disease: Improving Global Outcomes) are predicted about 0.4% and 0.1% of the general population, respectively.13 In parallel, the number of patients receiving dialysis treatment is estimated at 2 million worldwide. With the decrease in kidney functions, there is a significant decrease in B2-microglobulin catabolism, which is more evident in the ESRD period.[14] B2-microglobulin is part of class 1 major histocompatibility complex (MHC) normally located in the membrane surface of nucleated cells and it is removed by glomerular filtration and catabolism in the proximal tubule. Especially in the ESRD period, with the decrease in its catabolism, there is an increase in B2-microglobulin accumulation, especially in the musculoskeletal system. However, the accumulation of B2-microglobulin alone is not sufficient for tissue damage and pathological accumulation, but also its conformational change (by unfolding/misfolding of beta2-microglobulin) must be present.[15] Except for this conformational change, as a result of glycation and oxidative changes of the beta2-microglobulin that will develop later, an increase in pro-inflammatory activity in tissue and even necrosis and apoptosis in synovial fibroblasts may occur.[15] Advanced glycation end products of the beta2-microglobulin cause an increase of monocytes and macrophages in the accumulation area.[16] At the same time, glycated B2-microglobulin binds to its receptors on macrophages and fibroblasts, causing an increase in the release of pro-inflammatory cytokines.16 Apart from the decrease in beta2-microglobulin catabolism, the increase in its production may contribute to its accumulation in the tissues. In particular, the increase in the class – 1 MHC expiration of lymphocytes may develop due to the increase in the production of proinflammatory cytokines such as IL-1 or TNF alpha due to other clinical reasons.[17] The pathological accumulation of B2-microglobulin in the skeletal system causes some degree of destruction in the articulations by the local effect of the mononuclear leukocytes, and one aspect of this clinical condition is destructive SpA.

As it seems, destructive SpA is not a clinical scenario that includes purely mechanical problems of the skeletal system due to destructions. A destructive SpA is a form of arthritis that is directly related to local inflammation caused by B2-microglobulin accumulation and also systemic inflammation. Therefore, inflammatory joint pain can be expected in the clinical course of destructive SpA. Destructive SpA has not been investigated in terms of inflammatory properties in previously reported cases and clinical studies. At the same time, the current SpA diagnostic criteria were not used for the diagnosis of destructive SpA. For example, in the study of Chikawa T. et al., 33 patients with ESRD in the HD program who underwent lumbar or cervical spinal surgery were evaluated retrospectively according to radiological criteria, and destructive SpA was detected in half of them, but the pain characteristic and inflammatory markers of the patients were not specified.[18] In the study of Naito M. et al., 83 patients in the HD program were evaluated retrospectively according to radiological criteria, and destructive SpA was detected in 29 of them, but the pain characteristic and inflammatory markers of the patients were not specified.[4] In a multicenter study by Kessler M. et al., a total of 171 patients on HD treatment for more than 10 years were prospectively evaluated, and destructive SpA was detected in 24 of them according to radiological criteria.[19] In this study, the presence of IBP, the presence of sacroiliitis, and also the variability of inflammatory markers between groups were not investigated. In a more recent study by Hayami N. et al., 67 patients' RRT was evaluated, and a total of 24 patients were diagnosed with destructive SpA according to radiological criteria.[5] Similarly, the pain characteristics of the patients and distribution of inflammatory markers were not evaluated in this study. However, as mentioned above, we think that the diagnosis of IBP, sacroiliitis and SpA in ESRD patients deserves to be investigated by the current classification criteria since destructive SpA has an inflammatory origin.[2]

In our study, destructive SpA was detected in 15% of the patients when the research was conducted by the classical diagnostic criteria sets for SpA. Although no difference was detected in terms of serum CRP levels compared to the diagnosis of SpA, statistically significant differences were found in terms of advanced sacroiliitis and IBP. As a result, serum CRP levels were found to be higher in the group of patients with IBP and in the group of patients who had radiologically more advanced sacroiliitis. These findings support that the clinical findings of destructive SpA are associated with inflammation origin. We think that investigating destructive SpA by considering only radiological findings may lead to the detection of patients at advanced stages that require surgical intervention. In these patients, it should be considered that patients may have back pain of inflammatory origin, and SpA of inflammatory origin may develop, and patients should be questioned in terms of inflammatory joint pain. Early radiological imaging in patients with inflammatory joint pain may be useful for early detection of destructive SpA. On the other hand, the radiological findings of destructive SpA are known as narrowing of the intervertebral disc area, cysts, and erosions without significant osteophyte formation on the vertebral surfaces.20 There is no sacroiliitis among these classical radiological diagnostic criteria. However, it can be thought that pathologies occurring on the intervertebral joint surfaces in destructive SpA may also be seen in the sacroiliac joint. Therefore, we think that the sacroiliac joint should also be evaluated in the radiological investigation of destructive SpA. Another finding of our study was that the total duration of HD treatment of the patients was an independent risk factor for the development of destructive SpA. This finding is in agreement with another clinical study on destructive SpA.[21] Another finding of our study was that having the HLA-A01 allele was an independent risk factor for the development of destructive SpA. At first glance, it may be considered an unexpected finding. However, it is known that there is a relationship between the presence of the HLA-A1 allele and psoriatic arthritis and spondyloarthropathy-related internal derangement of the temporomandibular joint.[22,23,24] The presence of the HLA-A1 allele may be a risk factor for the development of destructive SpA. We do not know the clinical significance of this finding, but it is clear that larger-scale studies are needed to support this finding.

CONCLUSION

Destructive SpA is a disease of inflammatory origin, associated with inflammatory back pain and sacroiliitis, and its incidence increases significantly after more than 10 years of hemodialysis treatment. In the diagnosis of destructive SpA, the character and inflammatory origin of the pain and inflammatory markers should be investigated in addition to the radiological criteria. The presence of the HLA-A1 allele may be an independent risk factor for destructive SpA, but this finding needs to be supported by larger studies.

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Concept and Design: U.Ö., A.E.Y.;
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Literature review research and writing of the article: U.Ö., D.K., A.E.Y.;

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